

USER'S MANUAL

Compact Cardioid Microphones

Type 4021

Type 4022

Type 4023

Compact Wide Cardioid Microphones

Type 4026

Type 4027

Type 4028

Included in kit solutions:

Type 3521

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4021 & 4027



4022 & 4026



4023 & 4028

TECHNICAL DESCRIPTION

The cartridge

Types 4021, 4022, 4023, 4026, 4027 and 4028 are Cardioid (Pressure gradient) microphones that use the same microphone capsule as the standard microphones Types 4011, 4012, 4015 and 4016. The Compact Cardioid Microphones use a 19mm diameter prepolarized pressure gradient condenser microphone cartridge. Type 4021, 4022 and 4023 offer a first order cardioid pick-up pattern, the Type 4026, 4027 and 4028 offer a wide cardioid pattern (see Fig. 2 & 3).

The diaphragm is highly resistant to the most aggressive kinds of humidity. The large spacing between the diaphragm and the back plate in this cartridge makes the microphone highly insensitive to temperature influence and allows greater SPL handling before clipping occurs.

Type 4021, 4022 and 4023 are designed to have a linear on-axis response from 40Hz to 20kHz (± 2 dB) measured at 30cm distance (see Fig. 4). Type 4026, 4027 and 4028 are designed to have a linear on-axis response from 40Hz (± 2 dB) to 20kHz ($+3/-1$ dB) measured at 60cm distance (see Fig. 5) and are furthermore intentionally calibrated with a slight high-frequency soft boost. Great attention has also been paid to the microphone's off-axis performance during the design process (see Fig. 4 & 5).

The diaphragm is protected from dust by an acoustically transparent net behind the front protection grid and inside the back port of the cartridge. For optimum stability the microphone cartridge has undergone a special pre-aging process, which stabilizes all tensions in the materials as well as the polarization voltage.

The preamplifier

The Compact Cardioid and Compact Wide Cardioid Microphones use built-in ultra-small, thick-film preamplifiers with unity-gain, low noise FET-amplifier technology. The thick-film technology enables the microphone cartridge to be mounted on an exceptionally compact microphone housing with the preamplifier mounted directly behind the microphone cartridge. A circuit of passive components in the standard 3-pin XLR connector adapts the P48 phantom powering, separates the supply voltage from the audio signal and acts as an

impedance balancing circuit for optimum noise immunity. The pre-amplifier has a cable drive capability of up to 100 m after the XLR-connector (See Fig. 1 for pin designation).

All microphones come with an individual calibration chart of the selfnoise, sensitivity and the individual frequency response.

The mechanical design

Types 4021, 4022 and 4023 are acoustically identical as are the 4026, 4027 and 4028. They only differ in their mechanical design. All Compact Cardioid Microphones are delivered with 5m of extremely flexible, high quality microphone cable as standard. The 4021 and 4027 cable is side-mounted on the microphone and the 4022 and 4026 cable is rear-mounted. The 4023 and 4028 feature a triaxial Lemo-connector, for simple and safe attachment mounting of the microphones to DPA Compact Active Poles.

Important: The microphones will only operate within their specifications if powered correctly.

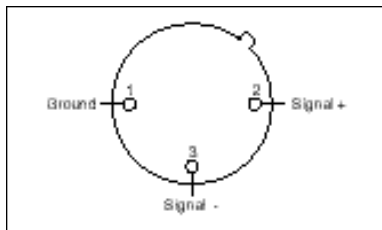


Fig. 1. External view of the output socket of the standard 3-pin XLR-connector used in the Types 4021, 4022, 4023, 4026, 4027 and 4028.

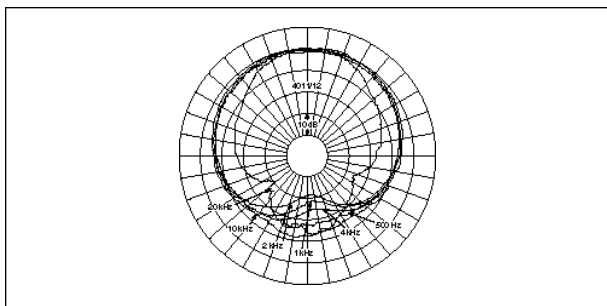


Fig. 2. Directional characteristics of Types 4021, 4022 and 4023. Shifts between emphasized circles indicate 10dB steps

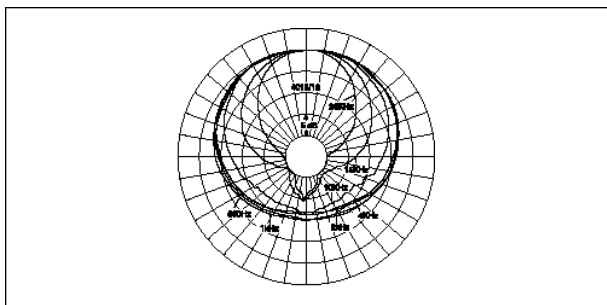


Fig. 3. Directional characteristics of Types 4026, 4027 and 4028. Shifts between emphasized circles indicate 5dB steps

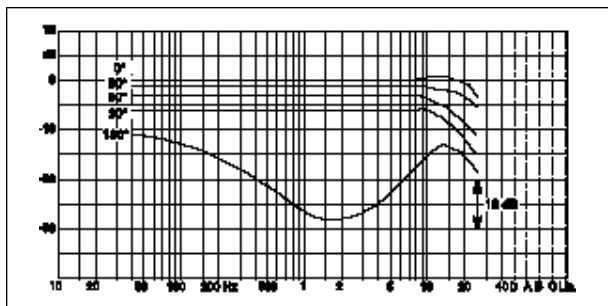


Fig. 4. On-and off-axis responses of Types 4021, 4022 and 4023 measured at 30cm.

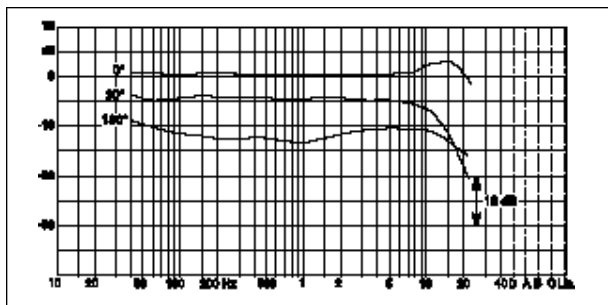


Fig.5 On-and off-axis responses of Types 4026, 4027 and 4028 measured at 60cm.

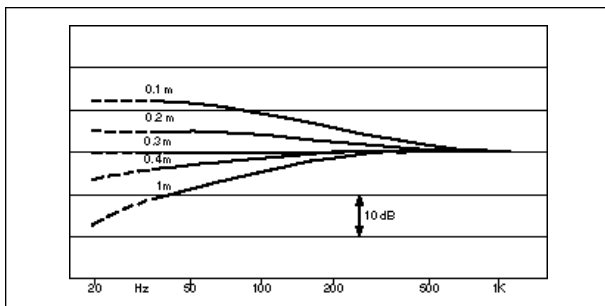


Fig. 6. The proximity effect exhibited by the Types 4021, 4022 and 4023.

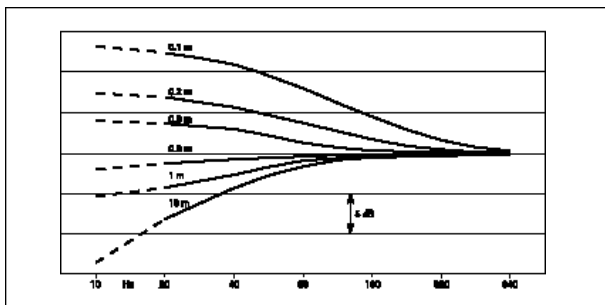


Fig. 7. The proximity effect exhibited by the Types 4026, 4027 and 4028.

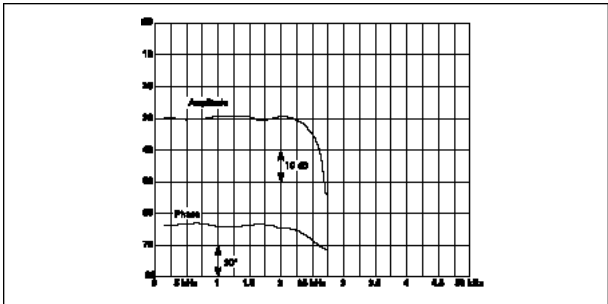


Fig. 8. On-axis amplitude and phase responses of Types 4021, 4022, 4023, 4026, 4027 and 4028 plotted using a linear frequency axis for evaluation of the phase response.

CARE OF MICROPHONES

It is important to bear in mind the following points with regards to mounting, microphone care and the use of accessories:

The microphone cartridge is tightly secured to the main body housing. No attempt should be made to remove it. If a replacement cartridge is required, contact your local DPA Microphones representative.

Use of windscreen is recommended when microphones are used in dirty or dusty environments.

When not in use, the microphone should be disconnected and kept in the case supplied.

The Compact Series Microphones are delivered in a rugged case together with a reel for the cable. Inside the reel there is room for both the microphone and the XLR-connector for maximum protection. When packing the microphones, first place the microphone and the XLR-connector inside the reel, then roll up the cable.

The Compact Series Microphones are delivered together with the SM4000 Suspension Mount for applications where the microphones need to be suspended from their own cable. To position the microphone you can bend and rotate the SM4000.



First place the microphone and the XLR-connector inside the reel, then roll up the cable.



Correct placement of the SM4000 on a DPA 4021 or 4027.

FULL SPECIFICATIONS

Cartridge type:

4021, 4022 and 4023: Pre-polarized condenser Type DMM0056

4026, 4027 and 4028: Pre-polarized condenser Type DMM0058

Principle of operation:

Pressure gradient

Power Supply:

Phantom P48

Frequency range:

4021, 4022 and 4023: On-axis: 40Hz to 20kHz ± 2 dB at 30 cm

4026, 4027 and 4028: On-axis: 40Hz ± 2 dB to 20kHz $+3/-1$ dB
at 60 cm with a max. 3 dB soft boost at 10 – 15 kHz.

Phase response:

Phase matching between any two microphones: $\pm 15^\circ$
(100Hz to 20kHz)

Directional characteristics:

4021, 4022 and 4023: First order cardioid

4026, 4027 and 4028: Wide cardioid

Sensitivity:

Nominally 7 mV/Pa (at 1 kHz)

Equivalent noise level A-weighted:

Typ. 20dB(A) re. 20 μ Pa

Equivalent noise level CCIR 468-1:

Typ. 25dB (max. 28dB)

Max SPL before clipping occurs:

145dB SPL peak

Total Harmonic Distortion:

110 dB SPL peak (<0.5% THD)

Preamplifier:

Output impedance:

<300 Ohm

Cable drive capability:

Up to 100m

Difference frequency distortion:

(DF2, DF3, Df = 70Hz) <0.5% at 110dB SPL peak

Influence of vibration:

<71dB equivalent SPL for 1 m/s^2 in direction of greatest sensitivity

Influence of magnetic field:

45dB equivalent SPL for 80A/m, 50Hz in direction of greatest sensitivity

Operating temperature range:

-10 to +55°C (+14 to 131°F)

Dimensions:**Microphone length:**

4021 and 4027: 31 mm

4022 and 4026: 35 mm; 52 mm incl. cable relief

4023 and 4028: 30 mm; 71 mm incl. connector

Microphone diameter:

19 mm

Capsule diameter:

19 mm

Weight:

4021 and 4027: 27.5g (without cable)

4022 and 4026: 30g (without cable)

4023 and 4028: 33g (without cable)

ACCESSORIES INCLUDED**Microphone Holders & Suspension Mounts**

SM4000 Suspension Mount

DUA0020 Small Windscreen for Ø19mm Microphone

ACCESSORIES AVAILABLE

Microphone Holders for Musical Instruments

CH4000	Microphone Holder for Cello
GM4000	Gooseneck Mount, 19 mm
MB4000	Magnet Base
SAX4000	Microphone Holder for Saxophone and Horn
VH4000	Microphone Holder for Violin and Bass

Shock Mounts

CSM4000	Compact Shock Mount
TSM4000	Table Shock Mount
UA0897	Shock Mount

Shock Mount Rubbers

DDS0019	Rubber Mount 19mm, Extra Soft
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Stereo Accessories

CXO4000	Compact XY and ORTF Stereo Holder
CXY4000	Compact XY Stereo Holder
EXY4000	Extension for Compact Stereo Holders
UA0837	Stereo Boom excluding Holders

Floor & Table Stands

CAP0400	Compact Active Pole, 400 mm
CAP0750	Compact Active Pole, 750 mm
CAP1250	Compact Active Pole, 1250 mm
DUA0100	Stand Extension, 100 mm
DUA0250	Floor Base, Ø250 mm
DUA0500	Stand Extension, 500 mm
FGS4000	Flamingo Grand, Single Stand
FGT4000	Flamingo Grand Twin, Double Stand
FJS4000	Flamingo Junior, Short Single Stand
SJD4000	Swivel Joint, Double
SJS4000	Swivel Joint, Single
TB4000	Table Base

Windscreens

DUA0022	Twin Windscreen for Ø19 mm Microphone
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3521: COMPACT CARDIOID STEREO KIT, P48

Professional Piano Miking Solution

The 3521 is a complete stereo kit with two 4021 Compact Cardioid Microphones carefully matched within 2dB on frequency response, sensitivity and self-noise. Complete with accessories, this kit is designed especially for low profile mounting directly inside a piano. With the XY/ORTF holder, the kit is also exceptional as a compact stereo pair for applications such as overhead for drums, horn or string sections, choirs, main or additional spot pair for small or big acoustic ensembles.

The complete kit is supplied in a sturdy carrying case and includes the combination XY/ORTF holder, 2 gooseneck mounts and 2 magnet bases for mounting on metal surfaces.

3521 KIT INCLUDES

2 x 4021	Compact Cardioid Microphone (matched)
2 x GM4000	Gooseneck Mount, 19mm (0.75in)
2 x MB4000	Magnet Base
1 x CXO4000	Compact XY and ORTF holder



SERVICE & REPAIR

Products from DPA Microphones are extremely stable, and there should not be any significant change in the specifications with time and use. If, however, you are not totally satisfied with the characteristics exhibited by these products, contact your nearest DPA Microphones representative for further details of service and the repair facilities that are available. DPA Microphones has a maximum seven working days in-house service policy, usually ensuring that no more than seven working days will elapse from the day the item for service is received and accepted to the day we are ready to return it to you. Please contact DPA Microphones for your nearest representative on

Tel: +45 48 14 28 28

Fax: +45 48 14 27 00

You can also get in touch with DPA Microphones via the internet using e-mail **info@dpamicrophones.com**
Visit our website at **www.dpamicrophones.com**

WARRANTY

All products from DPA Microphones are covered by a two-year limited warranty on both mechanical functionality and documented specifications as long as the items are not mistreated, abused or modified in any way. In case of a warranty claim your invoice is your warranty registration.

CE STANDARD

The CE-mark guarantees all products conform to relevant standards approved by the European Community. The products described in this User's Manual comply with current relevant standards when used with cables from DPA Microphones. EMC Directive: 89/336/EEC, amended by 92/31/EEC and 93/68/EEC
Low Voltage Directive: 73/23/EEC, amended by 93/68/EEC